Marwadi University
Marwadi Chandarana Group

Bachelor of Technology

Civil Engineering

Introduction to Programming

01CI1517

Objective of the Course:

- To acquaint the students with the basics of computer system, its components, and data representation in computer.
- To develop various algorithm and programs for C/C++ language.
- To develop software applications to tackle problems related to Basic core civil engineering components.
- Use of programming skills for optimization of structural systems in Civil Engineering.

Credit Earned: 03

Prerequisite: Structural Analysis-1 and Computer Programming

Student's learning outcomes:

After successful completion of the course, it is expected that students will be able to,

1. Understand programming problems by developing logical through flow charts and algorithms
2. Apply the Concepts of string, arrays, pointers, structures, class used for Program writing.
3. Evaluate problems based on Civil Engineering using coding & programming.
4. Create various programs for structural optimization.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	IA (M)	CSE (I)	Viva (V)	Term Work (TW)	
02	01	00	03	50	30	20	25	25	150

Detailed Syllabus

Sr No.	Title of the Unit	Number of hours
1	**Introduction**	**6**
	Review of C, Difference between C and C++, Procedure Oriented and Object-Oriented Approach. Basic Concepts: Objects, classes, Principals	

	like Abstraction, Encapsulation, Inheritance and Polymorphism. Dynamic Binding, Message Passing. Characteristics of Object-Oriented Languages. Introduction to Object-Oriented Modeling techniques (Object, Functional and Dynamic Modeling).	
2	**Classes and Objects**	**7**
	Abstract data types, Object & classes, attributes, methods, C++ class declaration, Local Class and Global Class, State identity and behavior of an object, Local Object and Global Object, Scope resolution operator, Friend Functions, Inline functions, Constructors and destructors, instantiation of objects, Types of Constructors, Static Class Data, Array of Objects, Constant member functions and Objects, Memory management Operators.	
3	**Application of Coding & Programming Skills in Relevant Civil Engineering Topics**	**15**
	Use of C/C++ to create various programs to solve structural analysis problems such as thin cylinders, support reactions, strain energy.	
	Use of C/C++ to create various programs to solve Geotechnical Engineering problems such as earth pressure, slope stability.	
	Use of C/C++ to create various programs to solve Highway Engineering problems such as Highway geometric design.	
	Use of C/C++ to create various programs to generate hydrology and water resources engineering models such as watershed models.	
	Total	**28**

List of Tutorials

Sr. No.	List of Tutorial
1	Program in C/C++ to understand basic syntax, data types, operators.
2	Program in C/C++ to understand function and arrays.
3	Program in C/C++ to understand strings and pointers.
4	Program in C/C++ to understand basic structures and file handling.
5	Programs for Structural Analysis Problem - I
6	Programs for Structural Analysis Problem - II
7	Programs for Geotechnical Engineering related problem - I
8	Programs for Geotechnical Engineering related problem - II
9	Programs for Highway Engineering related problem - I

10	Programs for Highway Engineering related problem - II
11	Programs for Hydrology and water resources related problem - I
12	Programs for Hydrology and water resources related problem - II

Suggested Theory Distribution

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve an effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
15%	20%	20%	20%	15%	10%

Instructional Method and Pedagogy:

1. Prerequisite of the course and its pattern shall be discussed on the commencement of the course.
2. Lectures shall be conducted in class room using various teaching aids.
3. Presence in all academic sessions is mandatory which shall carry 5% marks of the total internal evaluation.
4. At the end of each unit/topic an assignment based on the course content shall be given to the students which shall carry 5% weightage for timely completion and submission of the assigned work.

Recommended Study Material

1. Programming in ANSI C by Balaguruswamy.
2. Programming with ANSI and Turbo C by Ashok Kamthane.
3. Programming in C Ansi standard by Yashwant Kanetkar.
4. Programming with C, Gottfried, McGraw-Hill.